Before the

FEDERAL COMMUNICATIONS COMMISSION

Washington, D.C. 20554

In the Matter of	)	
	)	
Amendment of the Commission's Rules	)	
to Establish Part 27, the Wireless	)	GN Docket No. 96-228
Communications Service ("WCS")	)	

Reply Comments of Primosphere Limited Partnership

Leslie A. Taylor
Guy T. Christiansen
Leslie Taylor Associates
6800 Carlynn Court
Bethesda, MD 20817-4302
(301) 229-9341

Its Attorneys

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EXECUTIVE SUMMARY

The Commission, in allocating the 2305-2320 MHz and 2345-2360 MHz bands to a new communication service, in selecting a service and developing technical requirements, must protect the satellite digital audio radio service in the band 2320-2345 MHz. The Commission must adopt appropriate out-of-band emission limits, maximum power levels and polarization requirements so that the satellite digital audio radio service will be able to provide service in the public interest.

The Commission should allocate the 2305-2320 MHz and 2345-2360 MHz bands to a specific communications service, rather than letting auction winners determine the service. The Comments do not support the use of the bands for a CMRS or PCS-type service and such service would have a negative impact on the current implementation of PCS as well as the ongoing auctions for PCS licenses. The Commission must take care to allocate spectrum based on public need for the service in order to maintain respect for the fairness and predictability of its processes. An orderly approach to spectrum allocation will best serve the public interest and support continued innovation in new communications services. Proponents of new services will be discouraged if the Commission does not allocate spectrum in an orderly way.

The Commission should proceed expeditiously to adopt rules for the satellite digital audio radio service and to issue licenses for that service. It should also commence coordination between satellite digital audio radio service licensees and Canada in order that such licensees are not disadvantaged with relation to possible terrestrial licensees in the 2305-2320 MHz and 2345-2360 MHz bands.

Following this course will assure that both satellite digital audio radio and a new, well defined and needed communications service are implemented.

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To: The Commission

Reply Comments of Primosphere Limited Partnership

Primosphere Limited Partnership ("Primosphere"), by its attorneys, hereby respectfully submits these reply comments in response to the Commission's Notice of Proposed Rulemaking, FCC 96-441 (released November 12, 1996) ("WCS Notice"), in the above-captioned proceeding. Primosphere is an applicant for authority to construct, launch and operate a Satellite Digital Audio Radio Service (satellite DARS) system in the 2310-2360 MHz band.[1]

The Commission must ensure that it allocates the 2305-2320 MHz and 2345-2360 MHz bands to a service or services which are compatible with the satellite DARS in the 2320-2345 MHz band and must adopt technical rules for the new services which protect satellite DARS. To accomplish these objectives, the Commission should allocate the 2305-2320 MHz and 2345-2360 MHz bands to a specific communications service for which there is an identifiable need and in a manner which will promote confidence in the reliability and fairness of the Commission's processes. Finally, the Commission must expeditiously adopt satellite DARS licensing and service rules and license systems so that Americans, living in both rural and urban regions, can have access to additional high-quality audio programming.

With this approach, the Commission can fulfill the requirements of the

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[1] See Primosphere Application, File Nos. 29/30-DSS-LA-93 and 16/17-DSS-P-93, filed December 15, 1992.

Omnibus Consolidated Appropriation Act, 1997 ("Appropriations Act"),[2] its responsibilities under the Communications Act,[3] and assure that both satellite DARS and a new, well-defined and needed communications service are implemented.

I. The Commission Should Allocate the 2305-2320 MHz and 2345-2360 MHz Bands to a Service Which is Technically Compatible with Satellite DARS in the 2320-2345 MHz Band.

In order to safeguard the public benefits that will result from implementation of satellite DARS, the Commission must allocate the 2305-2320 MHz and 2345-2360 MHz bands to services which will not impede the implementation of satellite DARS or impair its usefulness or quality. Commenters in this proceeding recognized the problem faced by satellite services operating adjacent to bands allocated to a terrestrial mobile services. For example, ADC notes that DARS spectrum may need to be isolated from that used by terrestrial WCS.[4]

The Commission has found that an allocation to satellite DARS is in the public interest and will provide numerous benefits. In supporting its finding that an allocation for satellite DARS is in the public interest, the Commission cited the numerous public interest benefits that would be furthered by the allocation, including "new services to rural listeners, minority and ethnic groups and audiences whose first language is not English."[5]

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[2] P.L. 104-208, 110 Stat. 30009 (1996).

[3] Section 1 of the Communications Act requires the Commission "to make available, so far as possible, to all the people of the United States a rapid, efficient, Nation-wide, and world-wide wire and radio communication service...." 47 U.S.C. § 1 (1996). Section 303 directs the Commission to classify radio stations and "prescribe the nature of service to be rendered by each class of licensed stations and each station within any class." 47 U.S.C. § 303 (1996).

[4] Comments of ADC Telecommunications, page 6.

[5] Amendment of the Commission's Rules With Regard to the Establishment and Regulation of New Digital Audio Radio Services, 10 FCC Rcd 2310, 2314 (1995) ("Satellite DARS Notice").

The Commission should ensure that allocations and technical rules for the 2305-2320 MHz and 2345-2360 MHz bands protect satellite DARS in the 2320-2345 MHz band and that the satellite DARS proceeding is promptly concluded.

Moreover, by ensuring the viability of satellite DARS, the Commission also can fulfill the directive of Congress in the Appropriations Act to take into consideration the needs of public safety. The commenters in this proceeding did not support the allocation to WCS as a means of carrying out this mandate.[6] However, the Commission can promote the public safety through the prompt conclusion of the satellite DARS proceeding and the licensing of DARS systems.

Satellite DARS provides a public safety service that cannot be provided by any other service proposed by the Commission in its Notice. Satellite DARS will allow national over-the-air broadcasts of public safety messages. And, Primosphere is the only satellite DARS applicant which has proposed a national unscrambled broadcast service committed to providing capacity for emergency and public safety announcements. The public has a much greater interest in having access to this type of valuable service than in having a seventh or eighth mobile service provider which may result from the WCS allocation.

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[6] See, e.g., Comments of Association of Public Safety Communications Officials-International, Inc., at 6 and Comments of Motorola at 8-11.

II. The Commission Must Adopt Technical Rules Which Protect Satellite DARS in the 2320-2345 MHz Band.

The Commission, in allocating the bands 2305-2320 MHz and 2345-2360 MHz to any service or services, must recognize that the 2320-2345 MHz is a satellite receive band, characterized by receivers with relatively wide bandwidth, which will receive at low signal levels. Satellite DARS will be provided to mobile and fixed receivers which will be located in large numbers throughout the continental United States. Placing terrestrial transmit bands directly adjacent to satellite receive bands can adversely impact satellite receiver performance. Consequently, the Commission should take special care to adopt appropriate technical rules to protect satellite DARS in the band adjacent to systems which may be licensed in the 2305-2320 MHz and 2345-2360 MHz bands.

In the WCS Notice, the Commission proposes that the auction winners have broad flexibility in determining the nature of the service within the service area of license. Further, the Commission proposes to auction WCS licenses in geographic blocks. Permitting the licensees total flexibility for determining services in the WCS bands has the potential for disturbing use of spectrum in adjacent bands and causing a significant coordination workload for the Commission.[7] Such an approach will also negatively affect the implementation of satellite DARS in the band 2320-2345 MHz, which is not merely adjacent to the WCS bands, but sandwiched between the WCS bands.

To facilitate coordination within the 2305-2320 MHz and 2345-2360 MHz bands as well as with adjacent bands, the Commission should, if at all possible, create a single service. Moreover, the Commission must establish minimum technical rules on WCS transmissions that will protect the satellite DARS band. These technical rules should apply to all licensees operating in the WCS bands. The technical rules proposed by Primosphere are the minimum technical rules

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[7] See, e.g., Comments of Motorola, at 7, and Comments of Telecommunications Industry Association, at 10-11.

necessary to limit WCS interference to satellite DARS operations in the band 2320-2345 MHz, without unduly restricting service flexibility or operations in the WCS bands.

A. Technical Rules for the 2305-2320 MHz and 2345-2360 MHz Bands Must be Revised to Protect Satellite DARS in the Band 2320-2345 MHz.

1. Out-of-Band Emission Limits.

Analysis by satellite DARS applicants American Mobile Radio Corporation (AMRC) and Digital Satellite Broadcasting Corporation (DSBC) supports the Primosphere out-of-band emission calculations contained in Primosphere's comments.[8] These comments confirm Primosphere's calculations that the out-of-band emission limits proposed by the Commission are not adequate to protect satellite DARS in the 2320-2345 MHz band. As Primosphere stated in its Comments, the Commission's proposed limits "result in unacceptable WCS out-of-band emissions into the satellite DARS band."[9] The Commission, in the WCS Notice, proposes technical rules without regard to the nature or geographic coverage of the service and without consideration that different services may be provided in different areas. But, most seriously, the Commission proposes technical rules which fail to protect the provision of satellite DARS in the adjacent band of 2320-2345 MHz.

The proposed out-of-band emission limits for fixed, mobile and satellite DARS services in the bands set aside for WCS in the WCS Notice are inadequate to protect satellite DARS. These limits must be modified to more effectively limit WCS-generated interference into the band 2320-2345 MHz.

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[8] Comments of American Mobile Radio Corporation, Technical Statement, and Comments of DSBC, at 3.

[9] Comments of Primosphere Limited Partnership, at 5. A copy of the Technical Statement included with Primosphere's Comments is attached hereto as Attachment B.

To protect adjacent band satellite DARS, the Commission should adopt the following limits:

Out-of-band emissions spectral density operation into the 2320-2345 MHz band, may not exceed:

92 + 10 log (p) dB/MHz fixed services, directional antenna

92 + 10 log (p) dB/MHz fixed services, omni antenna

123 + 10 log (p) dB/MHz mobile operations

Where p is the maximum spectral power density, within the band of operation.

These out-of-band emission standards are feasible and can be met through the use of affordable and available filters in the transmitters licensed in the 2305-2320 MHz and 2345-2360 MHz bands as well as through the use of small guard bands within those band segments adjacent to the 2320-2345 MHz band. The guard bands would be required only in the band segments adjacent to the satellite DARS band.

2. Other Technical Rules.

The practical limitations of maintaining losses within the pass band of the satellite DARS receiver to a minimum restricts the level of input filtering in the receiver front end. This can subject the satellite DARS low-noise receiver to a high level or interference from adjacent bands. Out-of-band interference, if of a high enough level, will drive satellite DARS low noise receivers towards a non-linear state causing intermodulation components and spectrum smearing.

It is therefore recommended that the Commission impose regulations that transmissions in the adjacent WCS bands to satellite DARS be cross-polarized with respect to the satellite DARS transmission and that an adequate guardband be established by the Commission within the WCS band to allow the DARS mobile receivers to obtain some level of out-of-band filtering. The Commission in the past has recognized these difficulties and has taken steps in frequency band allocations to ensure that adequate separation exists between satellite receive bands and terrestrial transmit bands.

Thus, in addition to the more stringent out-of-band emission limits, the Commission should adopt other technical rules governing services in the 2305-2320 MHz and 2345-2360 MHz bands as follows:

(1) a requirement that the transmissions in the 2305-2320 MHz and 2345-2360 MHz bands be circularly polarized in the opposite sense to satellite DARS transmissions; and

(2) a limitation on the power of mobile service units in the bands 2305-2320 MHz and 2345-2360 MHz bands of 0.5 W and fixed transmitters of 100 W.

Draft technical rules are contained in Attachment 1 to these Reply Comments.

B. The Service Allocation as Well as Technical Standards Should Consider Transborder Coordination.

The Commission, in adopting an allocation for the 2305-2320 MHz and 2345-2360 MHz bands, as well as in determining appropriate technical rules, must also consider transborder coordination issues. The satellite DARS systems using the 2320-2345 MHz band will face coordination with Canadian terrestrial and aeronautical telemetry systems regardless of what services are provided in 2305-2320 MHz and 2345-2360 MHz. And, those services also must coordinate with Canada and Mexico.

Canada not only has the terrestrial fixed and aeronautical telemetry systems in the bands 2305-2320 MHz and 2345-2360 MHz but has recently made available these bands for low-capacity point-to-point or point-to-multipoint microwave systems operating in 1 to 10 MHz of bandwidth.[10] Mobile or radiolocation service, as components of WCS, likely would be very difficult to coordinate with the Canadian systems.

Because of the impact coordination may have on system design and operating parameters, the Commission must ensure that satellite DARS licensees

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[10] See Comments of Telecommunications Industry Association, at 11, which reference the New Standard Radio System Plan 302.29 of Industry Canada.

are permitted to coordinate as soon as they are licensed, and in any event, prior to or contemporaneously with, systems which may be licensed in the 2305-2320 MHz and 2345-2360 MHz bands. Satellite DARS licensees must not be disadvantaged vis a vis terrestrial systems in any cross-border coordinations.

C. The Commission Should Restrict Use of the Band 2320-2345 MHz by Aeronautical Mobile Telemetry.

As discussed by Primosphere in its Comments,[11] the Commission should ensure that satellite DARS is protected from aeronautical telemetry and associated telecommand use in the bands 2310-2320 MHz, 2320-2345 MHz, 2345-2360 MHz as well as aeronautical telemetry use above 2360 MHz (when the service moves). Moreover, satellite DARS should not be required to protect these services (other than launch support activities at 2332.5 MHz).

The Commission must reject the suggestion of the Aerospace and Flight Test Radio Coordinating Council (AFTRCC) that "flight testing retain its footnote primary status in the band 2320-2345 MHz." [12]

As stated by Primosphere in its Comments, satellite DARS and any new services in the 2305-2320 MHz and 2345-2360 MHz bands should be treated the same with respect to allocations for flight testing. The Commission must clarify that mobile and radiolocation services, including telemetry and telecommand for flight testing, will not be permitted to operate co-frequency with the broadcasting - satellite (sound) service. Spectrum sharing between satellite DARS and aeronautical telemetry is not technically feasible, even with aeronautical telemetry operating on a secondary basis.[13] It has been clearly established that the power

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[11] Comments of Primosphere, at 6-7.

[12] Comments of the Aerospace and Flight Test Radio Coordinating Council (AFTRCC), at 3.

[13] See Comments of SBC Communications, at 4. SBC questions whether secondary allocations for amateur radio service or aeronautical telemetry are actually practical, especially with respect to the proposed WCS.

flux density from aircraft telemetry emissions will cause harmful interference into the broadcasting-satellite (sound) service.[14] The Commission must ensure that satellite DARS operations in the 2320-2345 MHz band are protected from mobile and radiolocation services, including aeronautical telemetry. Consequently, Primosphere proposes a revision to the Commission's proposed U.S. footnote 328 so that satellite DARS is accorded the same treatment as licensees in the 2305-2320 MHz and 2345-2360 MHz bands with respect to aeronautical telemetry.[15]

III. The Commission Should Not Allocate the 2305-2320 MHz and 2345-2360 MHz bands for an Open-Ended Wireless Communications Service.

Consistent with the need to protect the adjacent band service of satellite DARS, the Commission should reconsider its proposal to allocate the 2305-2320 MHz and 2345-2360 MHz bands for an open-ended wireless communication service (WCS). By choosing a specific service which is needed in the public interest, the Commission can best assure that technical standards can be adopted which protect satellite DARS. The record in this proceeding establishes that there is no need for or public interest benefit to be served by making the spectrum available for a CMRS-type service. The comments demonstrate that, consistent with the views expressed by Primosphere, the Commission cannot and should not proceed to create a Wireless Communications Service (WCS) in the 2305-2320 MHz and 2345-2360 MHz bands as it has proposed.

Rather than supporting an open-ended wireless allocation, the comments urge the Commission to allocate the spectrum for a specific service in order that technical interference concerns can be adequately addressed, both within the 2305-

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[14] See Document TG 2-2/TEMP/93, December 6, 1994, which concludes that co-frequency, co-coverage operation between GSO systems providing BSS(Sound) and aeronautical mobile telemetry systems is not feasible. The paper notes that unacceptable interference is experienced by both services.

[15] See Appendix A to these Reply Comments.

2320 MHz and 2345-2360 MHz bands, and with services, including satellite DARS, in adjacent bands. Allocation for a specific service is needed to provide sufficient guidance to manufacturers for the development of equipment and in order to provide for orderly licensing through auction. And, allocation to a specific service is needed so that prospective licensees can most accurately develop strategies for bidding for licenses.

As the Comments abundantly demonstrate, the Commission must allocate spectrum to a specific service in order to carry out the mandate of the Communications Act to "prescribe the nature of [a] service," as well as to follow the direction of the Congress in the Appropriations Act, "to seek the most efficient use of the spectrum."[16]

A. An Open-Ended Wireless Communications Service is Not in the Public Interest.

The Commission should not proceed with the WCS. The establishment of an open-ended service, whereby auction winners decide whether to operate mobile, fixed, radiolocation or satellite digital audio radio systems, will not serve the public interest. As so accurately stated by Motorola in its comments, such action could "unintentionally fracture the market, raise equipment costs to users, retard manufacturer investment, increase interference and threaten the investment of existing operators."[17] Motorola and other commenters refer to the general purpose mobile service established in the mid-1980s as an example of where the Commission created a broad service for which no public need had been identified and for which no licenses were ever issued.[18] Likewise, an "open-ended" WCS could "backfire and disserve the public," according to Omnipoint.[19]

Such an open-ended service, where different services could be provided in

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[16] Appropriations Act, at § 3001(b)(1).
[17] Comments of Motorola, at 11.
[18] Supra, at 7.
[19] Comments of Omnipoint, at 2.

adjacent service areas would lead to endless coordination disputes. For example, depending on licensee choice, there could be PCS in Los Angeles and wireless video in San Diego in the same WCS band segment at the same frequency. These services could not operate compatibly, even with some geographic separation. Standard setting would be virtually impossible. WCS licensees would not be assured protection against harmful interference from non-compatible adjacent or co-channel licensees, according to Alcatel Network Systems.[20]

The proposed WCS will not permit the band to be used promptly and efficiently. An open-ended wireless service "will cause needless uncertainty...[that] likely will result in delay, if not complete preclusion, of the full and efficient use of the band, " according to the Cellular Telecommunications Industry Association.[21] Moreover, extensive Commission involvement would be required to resolve disputes between licensees.[22]

B. No Need Has Been Identified for Additional Spectrum for a Mobile, PCS-Type Service.

The Commission, in allocating spectrum, should ensure that the services for which it is allocated are needed in the public interest. The Commission makes no such finding in the Notice, but rather suggests that the "marketplace" will determine how the spectrum is to be used.[23] The Comments reject this approach and abundantly demonstrate the lack of public need for additional spectrum for mobile services.[24] As stated by 21st Century Telesis, the Commission "should not foster a 'glut' of new spectrum" for commercial mobile radio service.[25]

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[20] Comments of Alcatel Network Systems, at 2.
[21] Comments of the Cellular Telecommunications Industry Association, at 5.
[22] Comments of Motorola, cited supra, at 7.
[23] WCS Notice, at ¶18.
[24] See,e.g., Comments of 21st Century Telesis, at 2; Comments of Lucent Technologies, at 6; and Comments of Omnipoint, at 2.
[25] Comments of 21st Century Telesis, at 2.

There are currently two terrestrial cellular and three PCS service providers licensed to each MSA in the U.S. Soon three additional PCS providers will enter the market as the result of the Commission's D,E and F block PCS auctions. In total, 120 MHz of spectrum is allocated to broadband PCS alone.[26] The Commission's WCS proposal to include mobile applications in the 2305-2320 MHz and 2345-2360 MHz bands would offer questionable, if any, public benefit, and would vastly complicate sharing within the bands as well as with adjacent bands, such as 2320-2345 MHz where satellite DARS will operate.

In fact, the U.S. agencies tasked with spectrum management already have found that no additional spectrum is required for terrestrial wireless service. The National Telecommunications and Information Administration (NTIA), in a recent study of U.S. spectrum requirements for the period 1995-2005, stated that "[I]t is assumed that the amount of PCS spectrum (140 MHz) that the FCC has allocated is sufficient for the 10-year period."[27] In addition, the Commission recently commented on the lack of need for additional spectrum for PCS-type services, when considering what services should be allocated for spectrum released from federal government use. The Commission stated that "the recent allocation of 120 MHz for general mobile services in the form of broadband PCS is sufficient to satisfy the needs of general mobile service providers in this frequency range."[28]

Instead of letting auction winners determine the services to be provided, the Commission should seek additional comment on the suggestions for services for which there may be a public need, including: interactive video services;[29]

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[26] There is a total of 205 MHz available for CMRS. ADC Comments, at 5; BellSouth Comments, at 5. See Implementation of Sections 3(n) and 332 of the Communications Act, 9 FCC Rcd 7988, 8108 (1994).

[27] U.S. National Spectrum Requirements: Projections and Trends, U.S. Department of Commerce, March, 1995, at p. 37.

[28] Allocation of Spectrum below 5 GHz Transferred from Federal Government Use, 10 FCC Rcd 4769, 4781 (1995).

[29] Comments of ADC, at 3.

Wireless Fixed Access Local Loop;[30] Wireless Internet Access;[31] high-speed broadband data;[32] and wireless cable.[33]

Making available more spectrum for a licensee-determined service, which could include CMRS, could lead to "dumping" of spectrum on the market which will benefit only a few bidders who may choose to warehouse the spectrum for future use.[34]

C. The Commission Should Allocate Spectrum in a Manner Which Promotes Confidence in the Commission's Processes.

The Commission, as it increasingly utilizes auctions to issue licenses, should take care to promote the confidence of the public and the industry in the orderliness of its processes. Currently, the Commission is auctioning licenses for PCS. It is far from completing these auctions. Moreover, the Commission recently auctioned licenses in the C block for PCS, with payments for licenses to the U.S. Treasury to be made over a period of years. The release of additional spectrum for PCS-like service could be contrary to the Commission's objectives in pending and future PCS auctions, as well as within the allocation of spectrum and auctioning of licenses in other communications services.[35]

Development of new communications services and prospects for licensing such services will be impacted negatively if the Commission utilizes the WCS allocation to release more spectrum for mobile wireless service.[36] The Commission

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[30] See, e.g., Comments of DSC Communications Corp., at 6; Comments of Digivox Corporation, at 3; and Comment of Omnipoint, at 2.
[31] Comments of Pocket Communications, Inc., at 2; Comments of the Personal Communications Industry Association, at 7; and Comments of Omnipoint, at 2.
[32] Comments of Personal Communications Industry Association, at 7.
[33] Comments of BellSouth, at 3.
[34] Comments of Omnipoint, at 3.
[35] Comments of Motorola, at 7, Personal Communications Industry Association, at 6, Omnipoint at 5, and Primeco, at 6.
[36] Comments of Personal Communications Industry Association, at 7.

must ensure that its allocations at 2305-2320 MHz and 2345-2360 MHz are for a specific service for which there is a demonstrated need. Such an approach will provide an incentive for development of equipment, prompt implementation of service and is most likely to result in compatibility between in-band operations as well as with adjacent band services such as satellite DARS.

IV. The Commission Must Complete the Satellite Digital Audio Radio Service Rulemaking and Issue Licenses.

Before it licenses non-satellite DARS communications systems in the 2305-2320 MHz and 2345-2360 MHz bands, the Commission must conclude the satellite DARS rulemaking proceeding and issue licenses for satellite DARS systems. The record has firmly established that there is a public interest in the provision of digital audio radio by satellite. Moreover, four applicants, who have indicated their willingness to invest hundreds of millions of dollars in this new communications service, have had applications pending for more than four years.

Licensing and service rules for satellite DARS should be adopted now. The pioneer's preference review panel has issued its report recommending that no pioneer's preference be issued, and the applicants for preferences have all withdrawn their requests.

No impediment stands in the way of the Commission moving expeditiously to issue satellite DARS rules and licenses. Two years ago the Commission found "that the record supports a spectrum allocation for satellite DARS and that the allocation is in the public interest."[37] The Commission based its decision on its findings that satellite DARS will provide additional radio service to American consumers, providing service in geographic areas that are underserved and unserved. Moreover, the Commission determined that satellite DARS would

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[37] Amendment of the Commission's Rules with Regard to the Establishment and Regulation of New Digital Audio Radio Services, GEN Docket No. 90-357, Report and Order, 10 FCC Rcd 2310 (1995), at para. 22.

promote U.S. industrial competitiveness in communications satellite and receiver technology.

Within the docket to establish licensing and service rules for satellite DARS, the Commission found that:

> [I]mplementation of satellite DARS potentially will stimulate significant economic growth....[including creation of] jobs in industries involved in technological development and manufacture of spacecraft and receiver components, installation of receivers in vehicles, programming creation and origination, building and operation of satellite uplink facilities and construction and operation of customer service centers.[38]

The Commission cited the investment in space stations, in the range of $320 to $622 million per DARS system, as well as the investment in user receivers and gateway earth stations, as a "substantial investment in the U.S. economy."[39]

Regardless of the action the Commission takes concerning the establishment of the WCS, the Commission must issue satellite DARS licenses prior to issuing licenses for WCS. Orderliness and fairness in the regulatory process require that the Commission conclude the satellite DARS proceeding, and the issues concerning sharing with Canadian systems raised in that proceeding, prior to reallocating a portion of the spectrum to a new communications service. The Commission must take these actions to maintain the integrity of its processes and to ensure that prospective licensees and financial institutions can be confident that the Commission proceeds in a reasonable and equitable manner when allocating spectrum and issuing licenses. Without such assurance, prospective operators of communications systems, particularly those involving new communications services and technical concepts like satellite DARS, will be deterred from

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[38] Establishment of Rules and Policies for the Digital Audio Radio Satellite Service in the 2310-2360 MHz Frequency Band, IB Docket No. 95-91, Notice of Proposed Rulemaking, 11 FCC Rcd 1 (1996) ("Satellite DARS NPRM").

[39] Supra, at para. 5.

Attachment A

Revisions to Proposed Rules

The following revisions should be made to the rules proposed in the Commission's WCS Notice:

United States Footnotes

Revise US 328 as follows:

US 328 ~~In the band~~ The bands 2320-2345 MHz~~, the mobile and radiolocation services are allocated on a primary basis until 1 January 1997 or until broadcasting-satellite (sound) service has been brought into use in such a manner as to affect or be affected by the mobile and radiolocation services in those service areas, whichever is later~~ are also available for aeronautical telemetering and associated telecommand operations for flight testing of manned or unmanned aircraft, missiles or major components thereof on a secondary basis to the broadcasting-satellite (sound) service. The ~~broadcasting-satellite (sound) service during implementation should also take cognizance of the expendable and reusable launch vehicle~~ following frequencies~~y~~ is shared on a co-equal basis for telemetering and associated telecommand operations of expendable and re-usable launch vehicles whether or not such operations involve flight testing: ~~2312.5,~~ 2332.5 ~~and 2352.5~~ MHz. Other mobile telemetering uses may be provided on a non-interference basis to the above uses. ~~to minimize the impact on this mobile service use to the extent possible.~~

Reason for change: to align US328 with proposed USyyy so that broadcasting-satellite service (sound) and the wireless communications service are on an equivalent basis with regard to the mobile aeronautical telemetry service.

Proposed revisions to new part 27:

§ 27.53 Emission limits.

(a) The peak power of any emission outside the licensee's bands of operation shall be attenuated below the maximum peak spectral power density (p) within the band of operation by the following amounts:

(a) For fixed operations: By a factor not less than 43 + 10 log (p) dB on all frequencies between 2300 and 2305 MHz and above 2360 MHz; ~~and~~ not less than 70 + 10 log (p) dB on all frequencies below 2300 MHz; and not less than 92 + log (p) dB on all frequencies between 2320-2345 MHz ~~band~~;

(b) For mobile operations: By a factor not less than 43 + 10 log (p) dB on all frequencies between 2300 and 2305 MHz, and above 2360 MHz; not less than 123 + 10 log (p) dB on all frequencies between 2320 and 2345 MHz; and not less than 70 + 10 log (p) dB on all frequencies below 2300 MHz;

(3) For the purposes of this section, radiolocation shall be classified as either a fixed or mobile service, depending upon the application; and

(4) Compliance with these provisions is based on the use of measurement instrumentation employing a resolution bandwidth of 1 MHz or greater. However, in the 1 MHz bands immediately outside and adjacent to the frequency bands of operation a smaller resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed, provided the measured energy is integrated to provide the total energy in a 1 MHz bandwidth.

(b) For WCS satellite DARS operations: The limits set forth in section 25.202(f) of this chapter apply.

(c) When measuring the emission limits, the nominal carrier frequency shall be adjusted as close to the edges, both upper and lower, of the licensee's bands of operation as the design permits.

(d) When an emission outside of the authorized bandwidth causes harmful interference, the Commission may, at its discretion, require greater attenuation than specified in this section.

§ 27.54 Additional Technical Requirements.

(a) Radio transmitting equipment operating in the 2305-2320 MHz and 2345-2360 MHz bands must utilize circular polarization. This polarization must be of the opposite sense of polarization to that utilized by licensed satellite digital audio radio systems. Licensees of satellite digital audio radio systems must notify the Commission of their choice of polarization not later than six months after the date of issuance of satellite digital audio radio licenses in the 2320-2345 MHz bands.

(b) Under all conditions of modulation the maximum peak EIRP from a fixed radiator operating under this section shall not exceed 100 watts.

(c) Under all conditions of modulation the maximum peak EIRP from a mobile radiator operating under this section shall not exceed 0.5 watt.

§ 27.~~54~~55 Frequency stability.

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§ 27.~~55~~56 Field Strength limits.

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§ 27.~~56~~57 Antenna structures; air navigation safety.

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§ 27.~~57~~58 International coordination.

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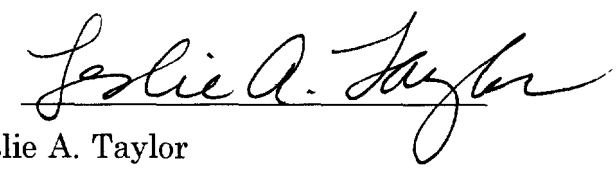
proposing new services.

V. Conclusion.

The Commission, in allocating spectrum for a new communications service in the 2305-2320 MHz and 2345-2360 MHz bands, must ensure that the satellite Digital Audio Radio Service in the adjacent band of 2320-2345 MHz band is not adversely affected by this new service. The Commission should select a suitable service, which is needed in the public interest, and should establish appropriate technical rules to protect satellite digital audio radio service. The Commission should not allocate the frequency bands to a CMRS-like service for which there is no demonstrated need. Finally, the Commission should proceed expeditiously to adopt licensing and service rules for satellite digital audio radio and issue licenses so that millions of Americans, in rural as well as urban areas, can benefit from this new radio communication service.

Respectfully submitted,

PRIMOSPHERE LIMITED PARTNERSHIP

By: 

Leslie A. Taylor
Guy T. Christiansen
Leslie Taylor Associates
6800 Carlynn Court
Bethesda, MD 20817-4302
(301) 229-9341

Its Attorneys

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ATTACHMENT B -TECHNICAL STATEMENT

In its WCS NPRM, the FCC proposes out-of-band emission criteria for fixed, mobile and satellite DARS services in the bands set aside for WCS. The proposed limits for out-of-band emissions spectral density from WCS operations into the spectrum set aside only for Satellite DARS, 2320 to 2345 MHZ, may not exceed the following:

70 + 10Log(p) dB/MHZ	fixed services
43 + 10Log(p) dB/MHZ	mobile operations

Where p is the maximum spectral power density.

Our analysis shows that these proposed limits will result in unacceptable WCS out-of-band emissions into the band set aside for satellite DARS services, 2320 to 2345 MHZ. If adopted, these limits will seriously disrupt satellite DARS services planned for the band 2320 to 2345 MHZ. This Technical Statement analyzes the level of this disturbance and proposes alternative limits for out-of-band emissions spectral density from WCS operations into the band 2320 to 2345 MHZ.

INTERFERENCE ANALYSIS

The satellite DARS satellite-to-mobile link is characterized by sensitive satellite receivers connected to non-steered broad beam antennas. Our analysis considers three WCS transmission modes:

1. Fixed transmitter, directional antenna;

2. Fixed transmitter, hemispherical antenna; and

3. Mobile transmitter, hemispherical antenna.

This interference analysis is based on limiting interference from WCS to satellite DARS to no more than a 0.2 dB or 5% increase in satellite DARS system noise. The Primosphere mobile receivers operating will have system noise temperatures of approximately 200° kelvin and a 3 dB gain non-steered hemispherical antenna.

In cases 1 and 2 we assumed the WCS transmitter was on a tower 100' away from the satellite DARS receiver operating in a mobile vehicle. In case 3 we assumed that the WCS transmitter was hand held and 3' away either in the satellite DARS equipped mobile vehicle or adjacent to it. It is worth noting that although this places the WCS transmitter in the satellite DARS antenna near field we have used far field antenna gain. The calculation of near field antenna gain would greatly complicate these calculations and not significantly change the results. We believe this to be a reasonable worst case for "PCS like" mobile operations in the WCS bands.

Although the probability of a mobile vehicle with satellite DARS driving through the beam of a directional fixed WCS antenna is low, case 1 must be addressed. Satellite DARS must be protected since a satellite DARS equipped mobile may be stop or be parked in close to a fixed WCS service tower or a listener with a fixed satellite DARS receiver may be in a WCS a fixed service beam. Therefore we have combined our treatment of cases 1 and 2 into one analysis.

The results of our analysis for cases 1, 2 and 3 are contained in Table 1. Cases 1 and 2 are combined in the column titled "Fixed." These results clearly show that interference for cases 1 (fixed transmitter, directional antenna, 2 (fixed transmitter, hemispherical antenna) and 3 (mobile) WCS operations, will greatly exceed acceptable limits for satellite DARS. In fact for case 3 WCS generated noise in the satellite DARS band would exceed the satellite DARS system noise level by an intolerable 80 dB. At this level of a single WCS mobile transmitter operating within 10 km of the satellite DARS receiver will increase noise in excess of 0.2 dB. Further, a single WCS mobile transmitter will fatally impair the operation of all satellite DARS receivers within a 5 km range.

REQUIRED SOLUTION

The proposed out-of-band emission criteria for fixed, mobile and satellite DARS services in the bands set aside for WCS as contained in the NPRM are inadequate to protect satellite DARS. These limits need to be modified to more effectively limit WCS generated interference in the band set aside for satellite DARS. It is recommended that the proposed limits be set as follows:

> Out-of-band emissions spectral density from WCS operations into the spectrum set aside only for satellite DARS, 2320 to 2345 MHZ, may not exceed:
>
> 92 + 10Log(p) dB/MHZ fixed services, directional antenna
> 92 + 10Log(p) dB/MHZ fixed services, omni antenna
> 123 + 10Log(p) dB/MHZ mobile operations
>
> Where p is the maximum spectral power density, within the band of operation.
>
> Note: Primosphere has used the resolution bandwidth of 1 MHZ, as proposed by the Commission. However an additional requirement is proposed that the out-of-band emission should not exceed 24 dB higher than the above numbers if measured in any 4 kHz slot in the band 2320 to 2345 MHz.

These tightened out-of-band emissions standards are feasible and can be met through the use of filters in the WCS transmitters and the establishment of guard bands within the WCS band segments adjacent to the satellite DARS band. These guard bands would only apply to transmitters operating in the WCS band segments adjacent to the satellite DARS band.

The filter and guard band requirements for a WCS transmitter relative to the DARS receiver can be readily accomplished through practical output filtering. It has been assumed that a mobile PCS unit will have a 100 kHz bandwidth and transmit at approximately 1 watt (0 dBW). With these operating characteristics a 10 section Chebyshev transmit filter and a frequency guard band on the order of 100 to 150 kHz are sufficient to reduce out-of-band emissions to the new levels stated above to protect the satellite DARS operations.

CONCLUSIONS

The out-of-band emission levels proposed from FCC Part 22 (47CFR 22.907 para b. (2)) are insufficient to protect satellite DARS from WCS operations. The proposed levels are inappropriate for WCS as they would allow a very high and totally unacceptable level of interference into the satellite DARS mobile receivers.

The above analysis shows that:

1. The out-of-band emission standards contained in the NPRM for the satellite DARS band are insufficient to protect satellite DARS from WCS operations;

   A more appropriate standard for out-of-band emission spectral density from WCS operations into the spectrum set aside only for satellite DARS, 2320 to 2345 MHZ, may not exceed the following:

   92 + 10Log(p) dB/MHZ fixed services, directional antenna
   92 + 10Log(p) dB/MHZ fixed services, omni antenna
   123 + 10Log(p) dB/MHZ mobile operations

   Where p is the maximum spectral power density within the band of operation.

3. The revised out-of-band emission standards are technically feasible and will have minimal impact to mobile WCS equipment designs.

Prepared by:

/S/ Richard Cooperman 12/04/96
Richard Cooperman Date

Kenneth Manning 12/04/96.
Kenneth Manning Date

TeleCom Consultants
15001 Redgate Drive
Silver Spring, MD 20905
301 384 2753 tel 301 236 4828 fax